

**APPARATUS AND METHOD OF EFFECTIVE FLUID INJECTION AND
VAPORIZATION FOR CHEMICAL VAPOR DEPOSITION APPLICATION**

ABSTRACT OF THE DISCLOSURE

5 A cross-flow injector is used to introduce fluids into a chemical vapor deposition process chamber separately and simultaneously for efficiently atomizing and vaporizing the fluids. The cross-flow injector consists of a three port cavity having an inlet nozzle, a throat region, and an exit nozzle. The injector cavity is defined by the tapering of the inlet and exit nozzles to the smaller diameter of the
10 throat region. The tapering allows for pressure differentials at the inlet, throat, and exit regions, and assures the inlet pressure being much greater than the exit region. The throat region consists of additional apertures for injecting dopants and precursors within the fluid flow. The pressure differential at the throat region atomizes and vaporizes the injected dopant and precursor fluids. In a second embodiment, the
15 injector cavity consists of two ports, having an inlet nozzle and a throat region. The inlet nozzle is tapered to meet the smaller diameter of the throat region, and the throat region extends to and becomes the exit nozzle portion so that the exit nozzle portion maintains the same diameter as the throat region.

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